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Remembering The Burning Ground Accident



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Presentation Topics

- Accident Overview
- GMX-3 and Scrap Disposal Crew
- Events of October 14, 1959
- Available Information
 - Accident scene analysis
 - Location of the explosion
 - Explosives involved in the accident
 - Crater analysis
 - Debris analysis
- Conclusions
- Changes to Explosive Operations
- Memorials



Accident Overview

On Wednesday, October 14, 1959, at approximately 13:32, four men working on a scrap disposal crew were killed during a routine operation at the Los Alamos Scientific Laboratory's S-Site burning ground. The cause of death was the accidental explosion of an estimated three hundred pounds of explosives. The subsequent investigation yielded the following:

- The exact cause of the explosion was not determined
- Operational and safety procedures were in place
- There is no specific evidence of any error in judgement or departure from instruction by any employee

Scrap Disposal Crew Members Involved in the Accident



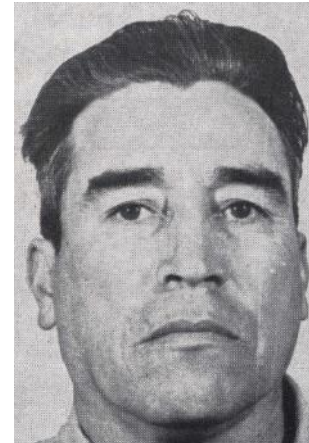
**Jose C.
Cordova [37]**

Explosive Plant Laborer



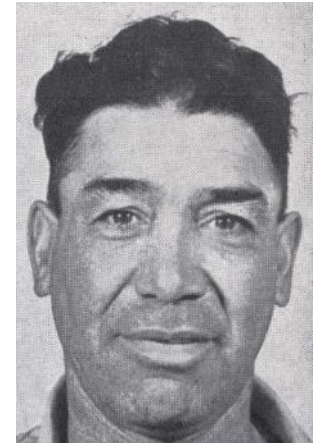
**Sevedeo
Lujan [53]**

Explosive Plant Laborer



**Escolastico
Martinez [47]**

Explosive Plant Laborer

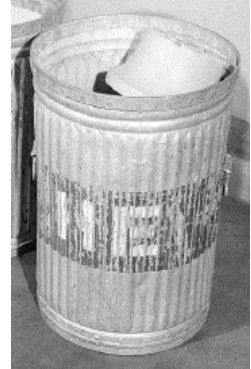
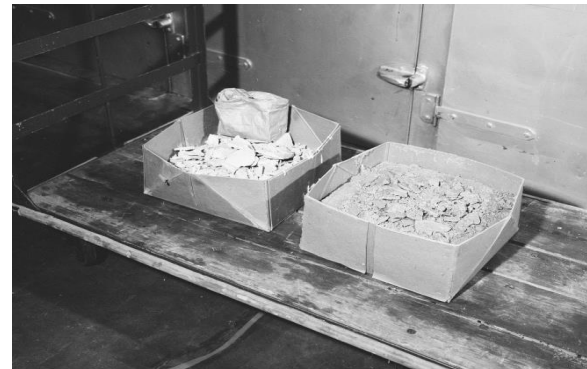
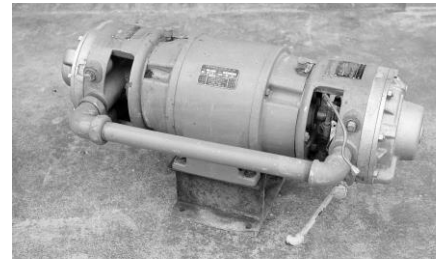


**Leopoldo F.
Pacheco [50]**

Labor Foreman

GMX-3 and Scrap Disposal Crew

- Group GMX-3 is a organization of scientists, engineers, and technicians whose mission is to develop high explosive (HE) systems
- The group utilizes various processes—including casting, pressing, and machining—which inevitably produce HE scrap for disposal
- Periodically, the HE scrap disposal crew removes the scrap from the processing area and hauls it to the S-Site to be eliminated via a burning operation
- The HE scrap disposal crew are responsible for picking up the scrap, loading and transporting it to the S-Site, unloading it, and igniting the material for disposal
- Typically, scrap consists of the following categories:
 - Equipment to be flashed
 - Equipment suspected of being contaminated with explosives would be burned along with the scrap explosive to remove the contamination
 - Wet HE waste
 - Wet machining waste (wet with machining coolant)
 - Dry HE waste
 - Discrete pieces of HE of various sizes



Events of October 14, 1959

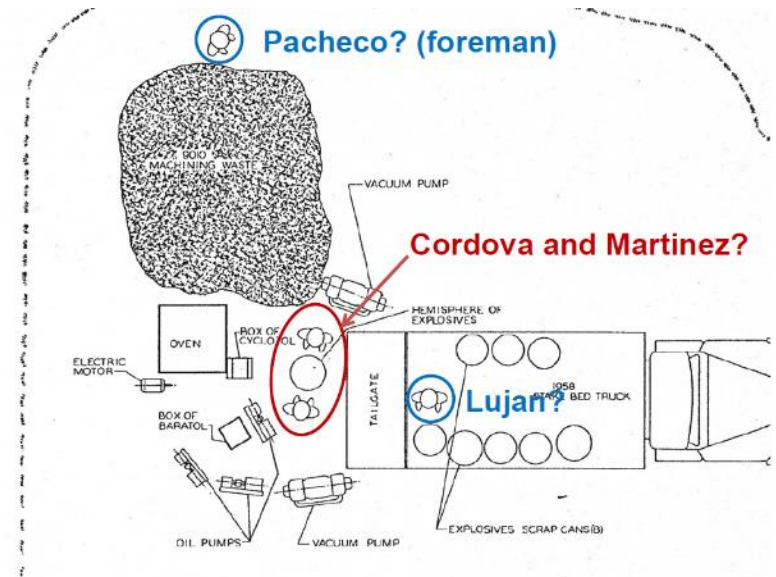
Loading Activities (13:00–13:25)

- 3 cans of dry scrap
- 2 boxes of dry scrap
- 1 large piece of dry scrap
 - This “Heavy” / “difficult to handle” piece was not a typical and was a special request pickup [14]

Activities at the Pit (reconstruction of available information)

- Scrap already located at the pit
 - Several pieces of equipment to be flashed
 - Wet scrap material laid out to dry
- Approx. 13:28 – Crew arrive at the site in two trucks
 - The hydraulic tailgate on the loading truck is positioned above the ground to aid in unloading
 - Pacheco is on the side of the burn pad checking the wet scrap material
 - Cordova, Lujan, and Martinez are unloading
- Approx. 13:32 – Unexpected explosion at the S-Site area
- Minutes later, personnel arrive on scene

AEC and LANL property officers were supposed to be at the site at 13:30 to certify the equipment to be flashed. They were delayed.



Available Information

Three Espanola Valley Men Among Blast Victims

Four men, three of them from the Espanola Valley, died in a violent explosion, Wednesday afternoon at Los Alamos. Officials still were investigating the blast and an official report will be issued later.

Known dead late Wednesday afternoon were Leopoldo Pacheco, 59, San Juan Pueblo, and Severed Lujan, 53, of Santa Fe. Missing and presumed dead are Jose C. Cordova, 27, and Escalante Martinez, 47, both of Chiriquito.

The four men were working together at Site when the explosion occurred at 1:40 p.m., shaking houses and rattling windows in some areas of Los Alamos. There had been no trace of the latter two found by 4 p.m., but they were presumed dead, according to University of California scientific laboratory spokesmen.

Next of kin were notified early Wednesday afternoon.

The four men were burning scrap explosives in a routine operation in the waste disposal area of the site when they were killed. The detonation took place on the truck and the truck burned.

There were no building damaged, no one else injured and no radiation involved, the lab reported.

The four men were working by themselves and were employed in non-technical jobs, unloading the scrap from the truck. The burning pit was located nearby by the explosion was on the truck, according to findings of the early investigation.

An explosion at the same site killed two men last March, Ray Means of Los Alamos and Leo Guerin of Santa Cruz. These men died when they were machining explosives inside a building.

This explosion occurred outside and well away from any building.

Pacheco was a foreman in GMX 3 and was employed by the lab in 1959. He is survived by the widow, Pola; six children, Mrs. Fabiola Cisneros, Las Cruces; Esther 21, Angle 17, Lucille 16, Carolina 11 and Marcelina 9, of San Juan; a brother E.A. Pacheco of Los Alamos and a

sister, Mrs. Delfina Gutierrez of Chama.

Pacheco was a laborer in 1959. He is survived by the widow, Ascension, children Jose 28, Los Alamos; Severed Jr. 28, Los Alamos; Cordelia Long, 26, Santa Fe; Tony 24, and Ben 22, Santa Fe. He is survived by two brothers, Thomas Lujan and Antonio Martinez, all of Cordova.

Cordova was employed in 1949 as a laborer, and is survived by the widow, Mabel, his mother, Mrs. Ben Cordova and father, Dionicio Cordova, both of Cordova; children Lorraine 14, Bertha 11, Judy 8 and Gloria 7, and a sister, Mrs. Elias Lopez, Coa

Explosion Victim Was Native Of The Valley

ESPAÑOLA — Severed Lujan of Santa Fe, one of four men killed in an explosion at Los Alamos Wednesday, was a native of Espanola Valley and lived in Espanola until six years ago when he moved first to Los Alamos and later to Santa Fe.

His sons, Noe and Severed Jr. (known as "Goofy") were outstanding Espanola high school athletes, and another son, Tony, made a name for himself on the Los Alamos high school team.

Noe was responsible for the touchdown that put Espanola in front of Los Alamos in a well remembered game a few years ago. He is now employed at Los Alamos by the University of California.

Lujan was employed in 1949 as a laborer, and is survived by the widow, Mabel, his mother, Mrs. Ben Cordova and father, Dionicio Cordova, both of Cordova; children Lorraine 14, Bertha 11, Judy 8 and Gloria 7, and a sister, Mrs. Elias Lopez, Coa

dova.

S SITE EXPLOSION KILLS FOUR MEN; OUTSIDE EXPERTS INVESTIGATE BLAST

Enroll Now for Medical Insurance

Friday, October 23, is the final day to open enrollment in the Federal Life Insurance Society group medical plan which is to replace Blue Cross. The Laboratory Insurance Committee has urged all intending to enroll to meet at the building, A-50, on Wednesday, October 23, at 10 a.m. for a presentation of the plan to go into effect January 1, 1960. Blue Cross coverage ends as of Thursday, October 22, a 10 p.m. enrollment had not occurred. Blue Cross has been cancelled because Blue Cross has announced increased rates or decreased benefits or both. The explosion plan will provide greater coverage than that offered by Blue Cross on rates similar to those presently charged by Blue Cross. The plan has the unanimous approval of the Laboratory Insurance Committee. To meet after the deadline, witnesses of the explosion will be required. Before the 23rd, this is not required.

(Continued on Page 3)

THE NEW MEXICAN

Sunday, October 25, 1959

Hill Committee Draws Blank In Investigation Of Explosion

By THE ASSOCIATED PRESS

A special committee selected to investigate the Oct. 14 high explosive accident at Los Alamos Scientific Laboratory which took four lives, reported Saturday it could not establish the cause of the explosion.

The committee's work was ended Saturday with a report of findings and recommendations to K. F. Hertford, manager of Albuquerque operations, Atomic Energy Commission.

In making its investigation at Los Alamos from Oct. 19-22, the committee worked closely with a LASL investigating committee.

The special committee was unable to establish the cause of the

accident. But it discovered the detonation occurred at or near the rear of the truck being used to transport high explosives to a burning area two miles south of Los Alamos. It also found that a portion of the high explosive cargo had not detonated in the blast which killed the men.

The victims of the explosion were Leopoldo Pacheco, 59, of San Juan Pueblo; Severed Lujan, 53, Santa Fe; Jose C. Cordova, 27, Chiriquito; and Escalante Martinez, 47, Chiriquito.

A number of detailed interpretations and recommendations were made by the committee with respect to specific procedures covered in the Army Ordnance Safety Manual, which Los Alamos uses

as a guide in its explosive handling operations. They covered operational procedures such as segregation of types of explosives, collection and transportation, unloading and handling at the disposal area, ignition, and the continuous training of operating personnel in safe methods.

Members of the committee were Frank C. Diluzio, deputy manager of Albuquerque operations, chairman; Joseph Higgins, with Mason Co., a private contractor at Los Alamos in the field of explosives; and Herbert M. Hoffman, chief of the High Explosives Section, Bureau of Ordnance, U. S. Navy.

news release

Public and Technical Information

FOR IMMEDIATE RELEASE

LASL 59-43

Public Relations Office

Los Alamos, NM., October 14—Four workmen were killed at 1:32 P.M. today in a detonation of high explosives at a waste-burning pit about four miles south of Los Alamos. The explosion occurred on a truck, possibly during the unloading operation. The waste burning process is routine. Two of the dead have been identified. They are Leopoldo Pacheco, 59, of San Juan Pueblo, and Severed Lujan, 53, of Santa Fe. Escalante Martinez, 47, occurred within the Tech waste burning pit is far from the Laboratory has long involving the use of chert.

Coroners Jury Hears Testimony

Explosive Experts To Study Accident

LOS ALAMOS — Three high explosive experts were scheduled today to testify before a coroners jury.

The AEC invited Joseph Higgins, representing an Iowa and Texas explosives contractor; Harry Brinkley, chief of the Indiana Field Safety Office of the Army Ordnance Corps; and Herbert Hoffman, chief of the Navy's Bureau of Ordnance High Explosives section, to aid in the investigation.

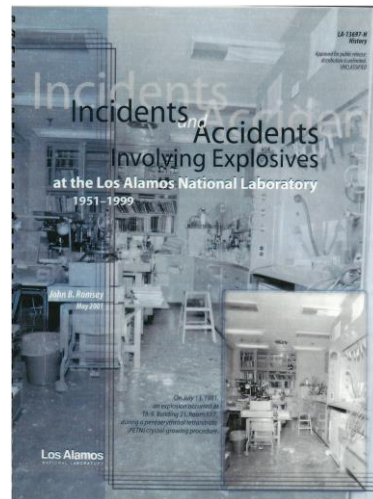
Frank C. Diluzio, deputy manager of the AEC Albuquerque Operations Office, will head the investigation group, assisting a Los Alamos study group appointed earlier by Bradbury.

A coroners jury which considered the deaths Friday was able to identify one of the victims only by the facts that he was missing he had been assigned to the explosive disposal job and has not reappeared since the blast. Not enough of his body was found to make a more positive identification.

Testimony before the jury also established that the explosive had probably detonated while being unloaded. The bed of the truck was blown off the chassis but no large crater was blasted in the ground.

Testimony was taken from those who collected the fragments of bodies following the blast and from fellow workers, who outlined the routine procedure in disposing of the waste explosives at the Site "burning grounds."

The special committee was unable to establish the cause of the accident.



LASL accident report (not publicly released until 2001)



2009 family visit to accident site and memorial

Accident Response

Many people, both on and off duty, responded after hearing the explosion:

- First responders made a immediate sweep of the area for survivors, but no one was found
 - Because of the active fire and the potential for remnant explosives, everyone was ordered to evacuate
- After approximately 40 minutes, it was deemed safe to reenter the area
- Officials determined that there were no survivors, and the recovery effort began

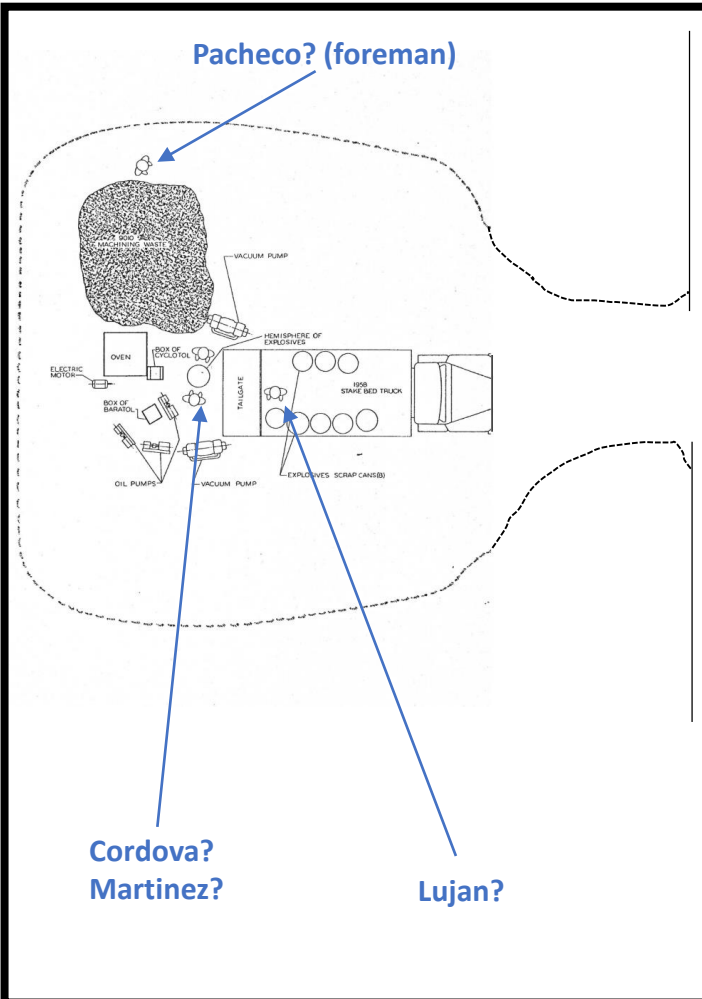
Pacheco (600 feet from site)



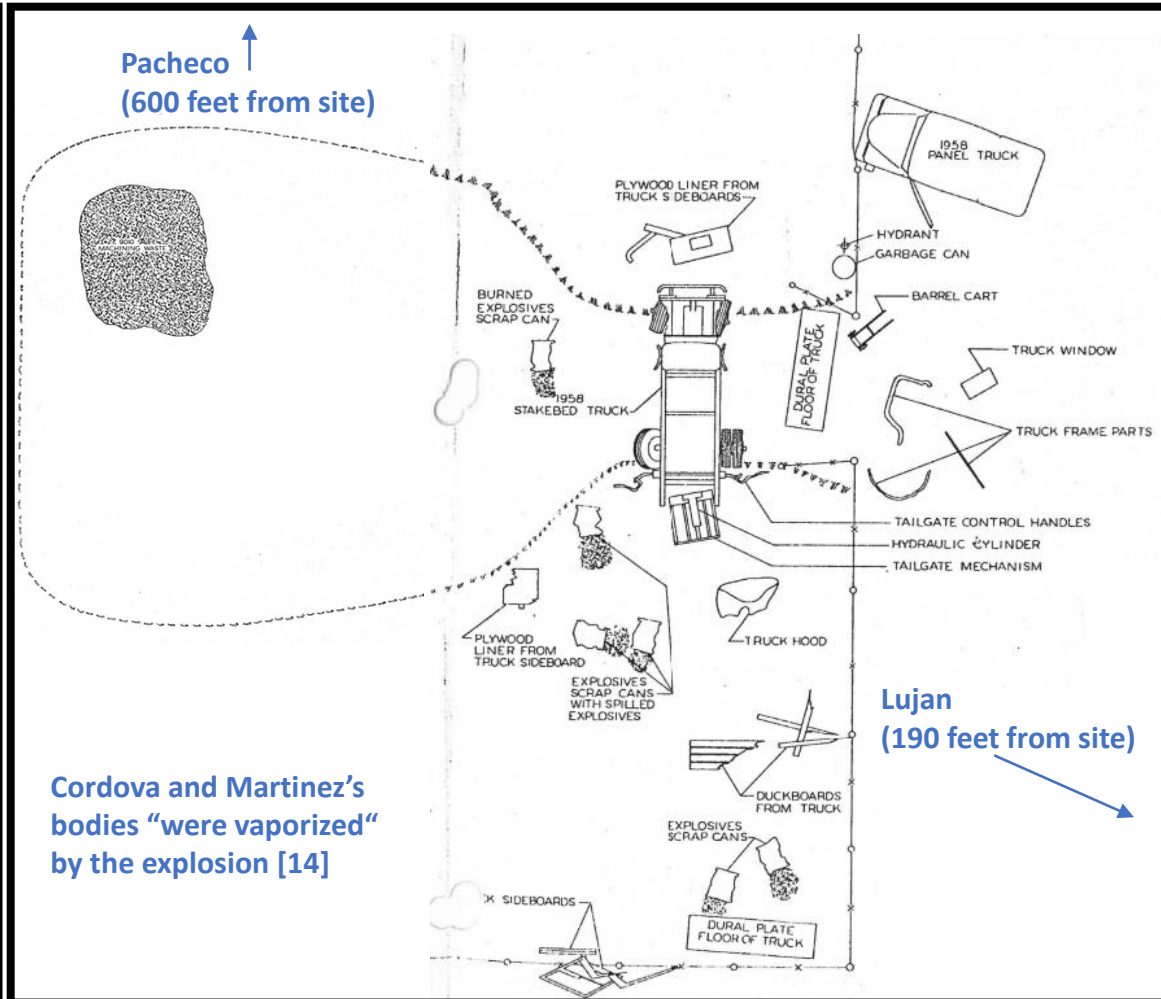
Lujan (190 feet from site)

Accident Scene Analysis

Reconstruction of the site
immediately before the accident



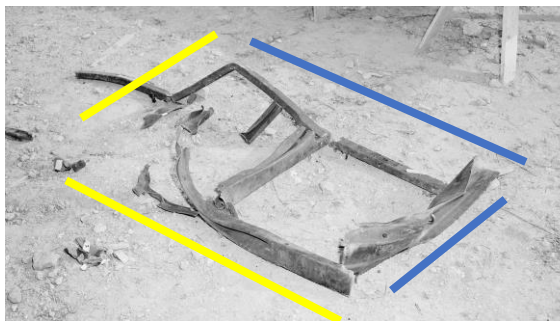
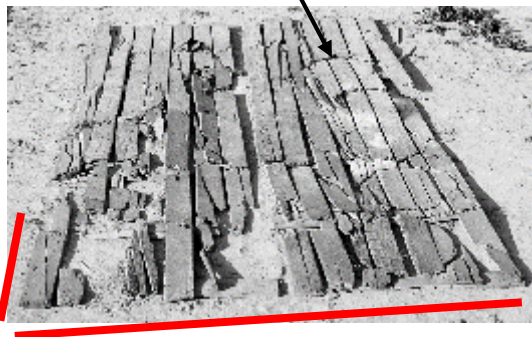
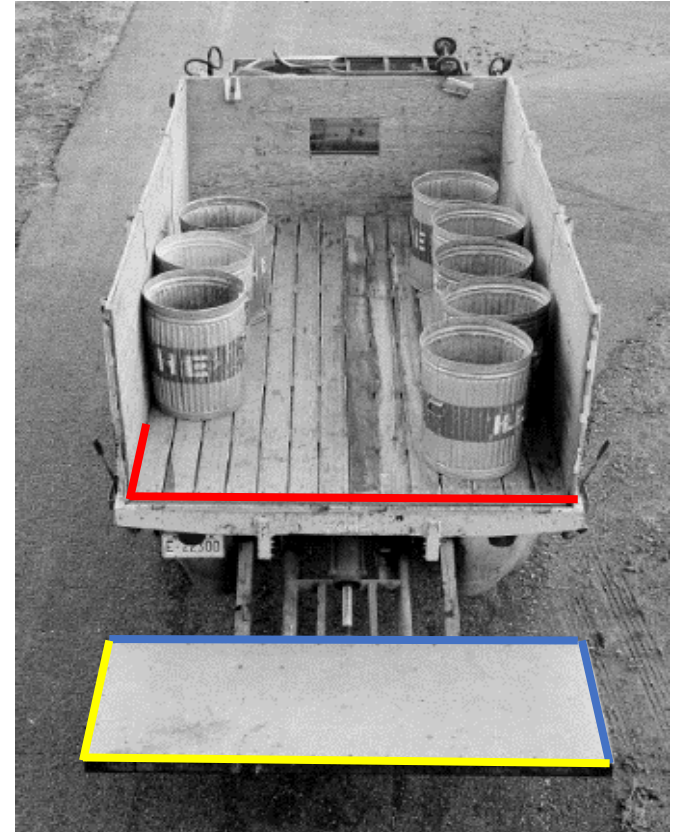
Condition of the site after the
accident



Location of the Explosion

Reconstruction of the truck bed and tailgate provides evidence that the explosion occurred at the left rear portion of the tailgate

- The tailgate was positioned above the ground to aid in unloading and is thought to have been roughly 18 inches off the ground
- Eight rings marks on the bed caused by the bed being forced upwards into the cans
 - The explosion occurred below bed level
 - Showed 8 dry scrap cans were in the bed at the time of the explosion



Explosives Involved in the Accident

The resulting configuration of debris required more energy to be released than any one of the materials could have produced by itself

Large piece of dry scrap / wet scrap

- No identifiable pieces of explosives were found
- They either were consumed by or contributed to the explosion

Cans of small dry scrap

- The cans were likely still in the truck when the explosion occurred
- All cans were accounted for, and none was severely damaged
- All but one had scrap remaining inside



Crater Analysis

One significant crater was found 40" × 24" × 10" deep

- This is not as deep as what would be expected for the quantity of explosives detonating while in contact with the ground



Debris Analysis

- Scrap loading truck
 - Turned 90 degrees and moved from what would be expected for unloading operations
 - Considerably more damage to rear left tire assembly than any other
- Debris found in all directions around the burning pad at various distances
- Pieces of the tailgate's surface plate indicated they were very close to a detonating explosive



Conclusions

Possible Causes

- Initiation by friction
- Initiation by dropping

Factors

- Potentially multiple things happening at once
- Open scrap containers
- Failure of tailgate mechanism
- Coarse gravel used on burning pad
- Large chunk of dry explosive was heavy and difficult to handle

Changes to Explosive Operations

- Creation of a written standard operating procedure
- Packaging of explosives
- Burning operation has been improved
- Sensitivity tests

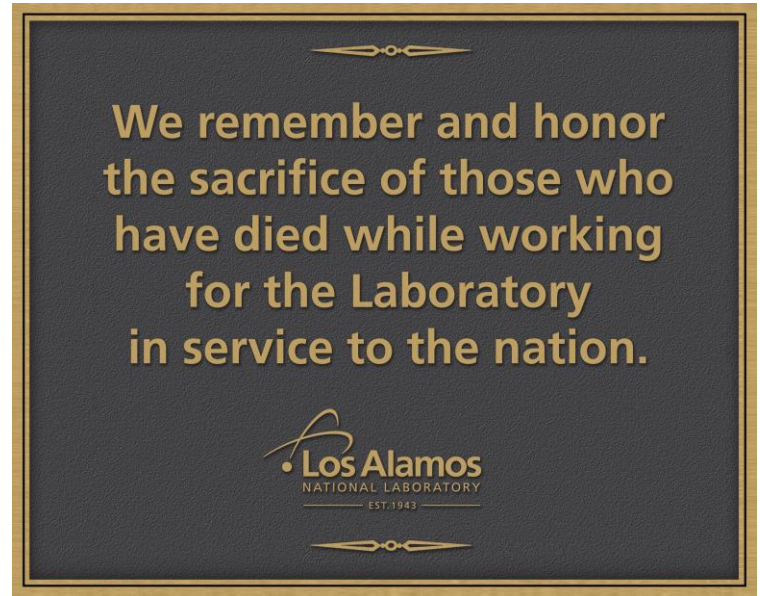
Current Methods to Dispose of Scrap HE

<https://www.youtube.com/watch?v=SkTItXeD4PE>

at 1 minute 9 seconds



Memorials



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15. Interview with Larry Fulgenzi, Friday, February 22, 2013. Video interview by David Schiferl and Cary Skidmore for Los Alamos Historical Society.